

# EXHIBIT 2

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

XR COMMUNICATIONS D/B/A VIVATO  
TECHNOLOGIES,

Plaintiff,

v.

VERIZON COMMUNICATIONS, INC.,  
CELLCO PARTNERSHIP D/B/A VERIZON  
WIRELESS,

Defendants.

Case No. 2:23-cv-00470-JRG-RSP

**LEAD CASE**

XR COMMUNICATIONS D/B/A VIVATO  
TECHNOLOGIES,

Plaintiff,

v.

AT&T SERVICES INC; AT&T MOBILITY  
LLC; and AT&T CORP.,

Defendants.

Case No. 2:23-cv-00468-JRG-RSP

**MEMBER CASE**

XR COMMUNICATIONS D/B/A VIVATO  
TECHNOLOGIES,

Plaintiff,

v.

T-MOBILE USA, INC.,

Defendant.

Case No. 2:23-cv-00469-JRG-RSP

**MEMBER CASE**

**DEFENDANTS' P.R. 3-3 AND 3-4 DISCLOSURES**

**I. INTRODUCTION**

Pursuant to P.R. 3-3 and 3-4 and the Docket Control Order (Dkt. 41), Defendants Verizon Communications, Inc. and Cellco Partnership d/b/a Verizon Wireless (collectively, "Verizon"); Defendants AT&T Services, Inc., AT&T Mobility LLC, and AT&T Corp. (collectively, "AT&T");

”); Defendant T-Mobile USA, Inc. (“T-Mobile”); Intervenor Nokia of America Corporation (“Nokia”); and Intervenor Ericsson, Inc. (“Ericsson”) (all defendants and intervenors collectively, “Defendants”) hereby disclose their P.R. 3-3 and 3-4 disclosures (“Invalidity Contentions”) in view of XR Communications d/b/a Vivato Technologies’ various P.R. 3-1 Disclosure of Asserted Claims and Infringement Contentions (collectively, “Infringement Contentions”), served on January 4, 2024. In the event that XR Communications d/b/a Vivato Technologies (“XR”) is granted leave to amend further its Infringement Contentions or amends its infringement theories, these Invalidity Contentions may change, and Defendants reserve the right to amend or supplement these Invalidity Contentions.

Defendants contend that each of the Asserted Claims (as defined below) by XR is invalid under 35 U.S.C. §§ 102, 103, and/or 112 for at least the reasons provided below.<sup>1</sup>

**A. Asserted Claims**

XR served Infringement Contentions alleging infringement of the following patents and claims (collectively, the “Asserted Patents” and “Asserted Claims”):

- Claims 18-26 and 28 of U.S. Patent No. 11,750,256 (the “’256 patent”); and
- Claims 11-13, 15-17, and 19-20 of U.S. Patent No. 11,777,569 (the “’569 patent”).

These Invalidity Contentions address only the Asserted Claims specifically set forth in XR’s Infringement Contentions. Nevertheless, Defendants do not concede that the claims that XR has not asserted are valid, and Defendants reserve all rights to amend these contentions if XR asserts additional claims and/or patents.

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<sup>1</sup> All Asserted Patents have a priority dates prior to March 16, 2013. Accordingly, all references to 35 U.S.C. §102 refer to the pre-AIA version of that statute defining prior art.

**B. Ongoing Discovery and Disclosures**

Defendants base their Invalidity Contentions on their current knowledge and understanding of the Asserted Claims and review of prior art, as of the date of these Invalidity Contentions. Defendants' Invalidity Contentions are made without the benefit of discovery regarding the parties' claim construction contentions, expert discovery, third-party discovery, and claim construction opinion or order by the Court. These Invalidity Contentions are provided without prejudice to Defendants' right to revise, amend, correct, supplement, modify, or clarify their Invalidity Contentions.

Defendants also base their Invalidity Contentions on their current knowledge and understanding of the Asserted Claims in view of XR's Infringement Contentions. Defendants reserve all of their rights both to seek leave to amend or supplement and to amend or supplement these contentions if XR supplements or amends its infringement contentions or otherwise responds to address any deficiency.

Defendants incorporate by reference all other bases for invalidity identified in Defendants' Answers, Initial Disclosures, and interrogatory responses in this matter, and the prosecution or post-grant review (e.g., during *Inter Partes* Review) of the Asserted Patents and all related patents and/or patent applications, including but not limited to statements made by both the patent applicant and patent examiners, and references cited therein.

Defendants further incorporate by reference all admissions regarding the Asserted Patents including, but not limited to, admissions in the specification of the Asserted Patents, and the prosecution or post-grant review of the Asserted Patents and related patents and/or patent applications. Defendants further incorporate any and all invalidity contentions previously served or subsequently served in any related litigation, or served in any prior litigation involving the Asserted Patents and related patents (collectively, the "Other Actions").

**C. Claim Construction**

The Court has not construed the Asserted Claims. Defendants map the prior art references to the Asserted Claims based on XR's apparent constructions, to the extent understood, of the Asserted Claims as advanced in XR's Infringement Contentions. However, nothing stated in this document or accompanying claim charts should be treated as an admission or suggestion that XR's apparent claim constructions are correct, or that any claim terms of the Asserted Claims are not invalid under 35 U.S.C. § 112 for being indefinite, failing to satisfy the written description requirement, or failing to satisfy the enablement requirement. In fact, Defendants specifically deny that XR's apparent claim constructions are proper.

Depending on the Court's construction of the Asserted Claims of the Asserted Patents, and/or positions that XR or its expert witness(es) may take concerning claim interpretation, infringement, and/or invalidity issues, the asserted prior art references may be of greater or lesser relevance. Given this uncertainty, the charts may reflect alternative applications of the prior art against the Asserted Claims. Thus, no chart or position taken by Defendants should be construed as an admission or a waiver of any particular construction of any claim term. Defendants also reserve the right to challenge any of the claim terms under 35 U.S.C. § 112, including by arguing that they are indefinite, not supported by the written description, and/or not enabled.

**D. Effective Dates**

XR asserted under P.R. 3-1(e) that the Asserted Claims of the '256 patent are entitled to a priority date of February 1, 2002. Defendants contest XR's alleged priority date. The '256 Patent is entitled to a priority date of no earlier than November 3, 2003.

XR asserted under P.R. 3-1(e) that the Asserted Claims of the '569 patent are entitled to a priority date of February 1, 2002. Defendants contest XR's alleged priority date. The '569 Patent is entitled to a priority date of no earlier than November 3, 2003.

Defendants contest XR's claimed priority dates as new matter was added to the specification of the Asserted Patents through later-filed applications disclosing new matter that was incorporated into the Asserted Claims. Defendants reserve the right to rely on prior art dated after XR's claimed priority date to the extent XR fails to prove entitlement to the above priority dates for any Asserted Claim. To the extent XR in the future seeks and is granted leave to amend its disclosures in an attempt to establish an earlier effective date, Defendants reserve the right to amend these contentions in response, including by disclosing additional prior art or earlier versions or evidence of the prior art disclosed herein.

#### **E. Prior Art Identification and Citation**

The accompanying invalidity claim charts (Exhibits A and B) cite to particular teachings and disclosures of the prior art references as applied to features of the Asserted Claims. However, persons having ordinary skill in the art may view an item of prior art generally in the context of other publications, literature, products, and understanding. Accordingly, the cited portions are only exemplary and are intended to put XR on notice of the basis for Defendants' contentions. Defendants have endeavored to identify the most relevant portions of the references, but the references may contain additional support for particular claim limitations. Defendants reserve the right to rely on uncited portions of the prior art references, other documents, and/or operational systems, as well as fact and expert testimony, to provide context or to aid in understanding the cited portions of the references and interpreting the teachings of the prior art and to establish bases for combinations of certain cited references that render the Asserted Claims obvious.

Defendants reserve the right to rely on any prior art system referenced, embodied, or described in any of the prior art references identified herein, or which embodies any of the prior art references identified herein. Moreover, Defendants reserve the right to rely on inventor admissions concerning the scope of the prior art relevant to the asserted patents found in, *inter*

*alia*, the prosecution histories or post-grant review proceedings of the asserted patents and related patents and/or patent applications, any testimony or declarations of the named inventors concerning the asserted patents or related patents, and any papers or evidence submitted by XR in connection with this litigation, any other pending or future litigation brought by XR involving the asserted patents or related patents. Defendants also may establish what was known to a person having ordinary skill in the art through treatises, published industry standards other publications, products, and/or testimony.

Where the invalidity claim charts (Exhibits A and B) cite to a particular figure in a reference, the citation should be understood to encompass the caption of the figure and other text relating to and/or describing the figure. Similarly, where the invalidity claim charts cite to particular text referring to a figure, the citation should be understood to include the figure and related figures as well.

The prior art references listed herein and in the accompanying claim charts may disclose the elements of the Asserted Claims explicitly and/or inherently. The prior art references are also relevant for their showing of the state of the art and reasons and motivations for making improvements, additions, and combinations. The suggested obviousness combinations are provided in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference is not itself anticipatory.

Further, the combinations of prior art references contained herein demonstrating the obviousness of the Asserted Patents under 35 U.S.C. § 103 are merely exemplary and are not intended to be exhaustive. All such combinations are intended to include and are in view of the knowledge of a person of ordinary skill in the art. Additional obviousness combinations of the identified prior art references are possible, and Defendants reserve the right to use any such

combination(s) in this Action. In particular, Defendants are currently unaware of the extent, if any, to which XR will contend that limitations of any particular claim(s) is/are not disclosed in the art that Defendants have identified as anticipatory. To the extent that XR does so, Defendants reserve the right to identify other evidence or references that anticipate or render obvious the particular claim(s).

Nothing in these Invalidity Contentions should be treated as an admission that any of Defendants' accused instrumentalities meet any limitation of the Asserted Claims. Defendants deny infringing the Asserted Claims. To the extent that any prior art reference identified by Defendants contains a claim element that is the same as or similar to an element in an accused instrumentality, based on a claim construction inferred from XR's Infringement Contentions, inclusion of that reference in Defendants' Invalidity Contentions is not a waiver by Defendants of any claim construction or non-infringement position, nor is it an admission or suggestion by Defendants that any accused instrumentality satisfies the limitations of the Asserted Claims under a proper construction of those claims.

**F. Lack of Inventorship and Proper Ownership**

Defendants reserve the right to assert that the Asserted Claims are invalid under 35 U.S.C. § 102(f) and/or § 102(g) in the event that Defendants obtain evidence that the named inventor of the Asserted Patents did not invent (either alone or in conjunction with other parties) the subject matter claimed in the Asserted Patents. Should Defendants obtain such evidence, Defendants will provide the name of the person(s) from whom and the circumstances under which the invention or any part of it was derived, and/or the circumstances surrounding the making of the invention before the patent application.



**G. Additional Reservation of Rights**

Defendants' identification in the prior art of claim elements recited in the preamble of any claims is not intended to indicate that any such preamble is limiting. All such disclosures are made only to the extent the preamble is determined to be limiting.

As described above, Defendants also intend to diligently seek discovery from third parties to demonstrate the inventions were known or used by others under 35 U.S.C. § 102(a), in public use and/or on-sale under 35 U.S.C. § 102(b), and/or earlier invention of the claimed inventions under 35 U.S.C. § 102(g). Defendants may therefore modify, amend, and/or supplement these Invalidity Contentions if and when further information becomes available.

Additionally, Defendants incorporate by reference into these contentions every claim element cross-referenced in XR's Infringement Contentions. For any element in XR's Infringement Contentions for which XR refers to the information from one or more other elements (whether in the same or a different patent), Defendants incorporate by reference the same cross-reference for these contentions.

Subject to the foregoing statements and qualifications, Defendants provide the following disclosures.

**II. P.R. 3-3 DISCLOSURES AND CONTENTIONS**

The following Exhibits (also referred to as Appendices) include claim charts of prior art references that, alone and/or in combination with other references, render the Asserted Claims of the Asserted Patents invalid under § 102 or 103, and further include (directly and/or in combination with the corresponding subparts of Section II.B. of this document) secondary references that would have been obvious to combine with the charted prior art references and motivations for making such combinations.

Exhibit A	U.S. Patent No. 11,750,256 (the “’256 patent)
Exhibit B	U.S. Patent No. 11,777,569 (the “’569 patent”)

**A. P.R. 3-3(a) Disclosures: Identification of Items of Prior Art that Anticipate**

Subject to Defendants’ reservation of rights, Defendants contend that the following prior art patents, printed publications, and systems, alone and/or in combination, anticipate and/or render obvious the Asserted Claims of the Asserted Patents.

As noted above, however, discovery is ongoing, and Defendants’ prior art investigation and third party discovery are therefore not yet complete. Accordingly, Defendants reserve the right to present additional items of prior art under 35 U.S.C. § 102(a), (b), (e), (f) and/or (g), and/or § 103 located during the course of discovery or further investigation. For example, Defendants expect to issue subpoenas to third parties believed to have knowledge, documentation, and/or corroborating evidence concerning some of the prior art listed in this and the following sections and/or additional prior art. These third parties include, without limitation, the authors, inventors, or assignees of the references listed in these disclosures. In addition, Defendants reserve the right to assert invalidity under 35 U.S.C. §§ 102(c) or (d) to the extent that discovery or further investigation yields information forming the basis for such invalidity.

While the categories of art (patents/applications, non-patent publications, and systems) below are organized by asserted patent number, because of the overlapping nature of the asserted patents, Defendants identify each reference in each category as art applicable to each of the asserted patents.

**1. Prior Art Patents and Published Patent Applications**

Defendants disclose the following patents and patent applications publications:

**a. The '256 Patent**

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A01	USP 7,224,758	U.S.	Brian Banister	May 29, 2007	Banister 758
A02	USP 6,738,020	U.S.	Eric D. Lindskog, Mitchell D. Trott, Hafedh Trigui, Serge de la Barbosa	May 18, 2004	Lindskog
A03	USP 6,888,809	U.S.	Gerard Joseph Foschini, Angel Lozano, Farrokh Rashid-Farrokh, Reinaldo A. Valenzuela	May 3, 2005	Foschini
A04	USPP 2001/0031647	U.S.	Shimon Scherzer, Piu Wong	October 18, 2001	Scherzer 647
A05	USP 6,124,824	U.S.	Guanghan Xu, Daniel Wee, Ying Chen, Yong Rao	September 26, 2000	Xu
A06	USP 6,175,550	U.S.	Richard van Nee	January 16, 2001	van Nee
A07	USP 7,139,324	U.S.	Juha Ylitalo, Marcos Katz	November 21, 2006	Ylitalo
A08	USPP 2003/0068983	U.S.	Sung-jin Kim, Ju-Ho Lee, Jong-Hyeuk Lee, Yong-Suk Lee, Ki-ho Kim, Hyeon-Woo Lee	April 10, 2003	Kim 983
A09	USPP 2002/0190901	U.S.	Shousei Yoshida	February 19, 2002	Yoshida 901
A10	USPP 2008/0170533	U.S.	Haruch Cyzs, Haim Grinberger	July 17, 2008	Cyzs
A11	PCT Pub. WO20000010 78A1	PCT	Robert Harrison	January 6, 2000	Harrison
A12	USPP 2002/0060643	U.S.	Shmuel Levy, Noam Livneh, Ori Stern, Ami Saguy	May 23, 2002	Levy 643

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A13	PCT Pub. No. WO2002047286A2	PCT	Ari Hottinen, Risto Wichman, Olav Tirkkonen	June 13, 2002	Hottinen 286
A14	USP 7,155,231	U.S.	Joseph P. Burke, Michael J. Wengler, Bhaskar D. Rao, Harris S. Simon	December 26, 2006	Burke
A15	USP 5,933,421	U.S.	Siavash Alamouti, Eduardo F. Casas, Michael Hirano, Elliott Hoole, Mary Jesse, David G. Michelson, Patrick Poon, Gregory J. Veintimilla, Hongliang Zhang	August 3, 1999	Alamouti
A17	USP 6,141,335	U.S.	Mikio Kuwahara, Seishi Hanaoka, Nobukazu Doi, Takaki Uta	October 31, 2000	Kuwahara
A18	USP 6,067,290	U.S.	Arogyaswami J. Paulraj, Robert W. Heath, Jr., Peroor K. Sebastian, David J. Gesbert	May 23, 2000	Paulraj 290
A20	USP 5,828,658	U.S.	Bjorn E. Ottersten, Craig H. Barratt, David M. Parish, Richard H. Roy, III	October 27, 2000	Ottersten
A22	USP 5,471,647	U.S.	Derek Gerlach, Arogyaswami Paulraj	November 28, 1995	Gerlach 647
A23	USPP 2002/0018530	U.S.	Sung-jin Kim, Kwang-bok Lee, Hyeon-Woo Lee, Keun-chul Hwang, Ho-Kyu Choi, Yong-Suk Lee	February 14, 2002	Kim 530
A26	USP 6,947,707	U.S.	Balaji Raghothaman	September 20, 2005	Raghothaman
A27	USP 6,533,012	U.S.	Marcos Katz	April 22, 2003	Katz

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A29	USP 6,473,036 / USPP 2003/0125040	U.S.	Jay Walton, Mark Wallace, Steven Howard	July 3, 2003	Walton 040
A30	USP 7,248,841	U.S.	Brian Agee, Matthew Bromberg	July 24, 2007	Agee 841
A32	USP 6,317,586	U.S.	Martin Haardt	November 13, 2001	Haardt 586
A33	USP 6,141,567	U.S.	Michael Youssefmir, Mitchell D. Trott, Kamaraj Karuppiah, Paul Petrus	October 31, 2000	Youssefmir 567
A34	USPP 2004/0018818	U.S.	Ari Hottinen, Risto Wichman, Olay Tirkkonen	January 29, 2004	Hottinen 818
A35	USP 6,031,877	U.S.	Simon Saunders	February 29, 2000	Saunders 877
A36	Japanese Patent Pub. JP2002290317 A	Japan	Daisuke Jitsukawa, Hiroyuki Seti, Yoshiaki Tanaka	October 4, 2002	Jitsukawa
A37	USPP 2002/0131381	U.S.	Sung-jin Kim, Yong- Suk Lee, Sung-Ho Choi, Hyun-woo Lee, Sung- Oh Hwang, Byung-Jae Kwak, Yong-Jun Kwak, Sang-Hwan Park	September 19, 2002	Kim 381
A38	USP 7,116,723	U.S.	Sung-jin Kim, Kwang- bok Lee, Hyeon-Woo Lee, Keun-chul Hwang, Ho-Kyu Choi, Yong- Suk Lee	October 3, 2006	Kim 723
A40	USPP 2002/0158801	U.S.	William Crilly, Ken Biba, Robert Conley	October 31, 2002	Crilly
A41	USP 5,634,199	U.S.	Derek Gerlach, Arogyaswami Paulraj, Gregory G. Raleigh	May 27, 1997	Gerlach 199

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A42	USP 6,895,258	U.S.	Shimon Scherzer, Piu Wong	May 17, 2005	Scherzer 258
A43	USP 6,760,388	U.S.	John Ketchum, Mark Wallace, Steven Howard, Jay Walton	July 6, 2004	Ketchum
A44	USP 6,359,923	U.S.	Brian G. Agee, Matthew Bromberg, Derek Gerlach, David Gibbons, James Timothy Golden, Minnie Ho, Elliott Hoole, Mary Jesse, Robert Lee Maxwell, Robert G. Mechaley, Jr., Robert Ray Naish, David J. Nix, David James Ryan, David Stephenson	March 19, 2002	Agee 923
A45	USP 6,473,036	U.S.	James Proctor, Jr.	October 29, 2002	Proctor 036
A46	USPP 2003/0017853	U.S.	Sridhar Kanamalur, Zygmund Turski, Henry Owen	January 23, 2003	Kanamalur
A47	U.S. 6,970,722	U.S.	Michael Lewis	November 29, 2005	Lewis
A48	U.S. 7,158,501	U.S.	Hideo Kasami, Kuniaki Ito, Kiyoshi Toshimitsu, Tomoko Adachi	January 2, 2007	Kasami '501
A49	U.S. 7,263,385	U.S.	Mehmet Izzet Gurelli, Raul Hernan Etkin	August 28, 2007	Gurelli
A50	U.S. 6,895,253	U.S.	Manuel Joseph Carloni, Michael James Gans, Reinaldo A. Valenzuela, Jack Harriman Winters	May 17, 2005	Carloni
A51	U.S. 7,042,394	U.S.	Ian Sayers	May 9, 2006	Sayers
A52	U.S. 2002/0041430	U.S.	Hideo Kasami, Shuichi Obayashi	May 9, 2006	Kasami '430
A53	U.S. 2003/0060205	U.S.	Joseph Shapira	Marcy 27, 2003	Shapira

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
A54	U.S. 6,795,409	U.S.	Michael Youssefmir, Mitchell D. Trott, Roger Rogard	September 21, 2004	Youssefmir
A55	U.S. 7,039,441	U.S.	Douglas O. Reudink, Mark D. Reudink	May 2, 2006	Reudink
A56	U.S. 5,592,490	U.S.	Craig H. Barratt, David M. Parish, Richard H. Roy, III	January 7, 1997	Barratt
A57	U.S. 7,529,525	U.S.	Omri Hovers, Shahar Kagan, Nanu Peri, Milena Chechik	May 5, 2009	Hovers
A58	USP 6,927,728	U.S.	Frederick W. Vook, Timothy A. Thomas, Xiangyang Zhuang	August 9, 2005	Vook

**b. The '569 Patent**

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
B01	USP 7,224,758	U.S.	Brian Banister	May 29, 2007	Banister 758
B02	USP 6,738,020	U.S.	Eric D. Lindskog, Mitchell D. Trott, Hafedh Trigui, Serge de la Barbosa	May 18, 2004	Lindskog
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B06	USP 6,175,550	U.S.	Richard van Nee	January 16, 2001	van Nee
B07	USP 7,139,324	U.S.	Juha Ylitalo, Marcos Katz	November 21, 2006	Ylitalo

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B08	USPP 2003/0068983	U.S.	Sung-jin Kim, Ju-Ho Lee, Jong-Hyeuk Lee, Yong-Suk Lee, Ki-ho Kim, Hyeon-Woo Lee	April 10, 2003	Kim 983
B09	USPP 2002/0190901	U.S.	Shousei Yoshida	February 19, 2002	Yoshida 901
B10	USPP 2008/0170533	U.S.	Haruch Cyzs, Haim Grinberger	July 17, 2008	Cyzs
B11	PCT Pub. WO200000010 78A1	PCT	Robert Harrison	January 6, 2000	Harrison
B12	USPP 2002/0060643	U.S.	Shmuel Levy, Noam Livneh, Ori Stern, Ami Saguy	May 23, 2002	Levy 643
B13	PCT Pub. No. WO20020472 86A2	PCT	Ari Hottinen, Risto Wichman, Olav Tirkkonen	June 13, 2002	Hottinen 286
B14	USP 7,155,231	U.S.	Joseph P. Burke, Michael J. Wengler, Bhaskar D. Rao, Harris S. Simon	December 26, 2006	Burke
B15	USP 5,933,421	U.S.	Siavash Alamouti, Eduardo F. Casas, Michael Hirano, Elliott Hoole, Mary Jesse, David G. Michelson, Patrick Poon, Gregory J. Veintimilla, Hongliang Zhang	August 3, 1999	Alamouti
B17	USP 6,141,335	U.S.	Mikio Kuwahara, Seishi Hanaoka, Nobukazu Doi, Takaki Uta	October 31, 2000	Kuwahara
B18	USP 6,067,290	U.S.	Arogyaswami J. Paulraj, Robert W. Heath, Jr., Peroor K. Sebastian, David J. Gesbert	May 23, 2000	Paulraj 290
B20	USP 5,828,658	U.S.	Bjorn E. Ottersten, Craig H. Barratt, David M.	October 27, 2000	Ottersten



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			Parish, Richard H. Roy, III		
B22	USP 5,471,647	U.S.	Derek Gerlach, Arogyaswami Paulraj	November 28, 1995	Gerlach 647
B23	USPP 2002/0018530	U.S.	Sung-jin Kim, Kwang-bok Lee, Hyeon-Woo Lee, Keun-chul Hwang, Ho-Kyu Choi, Yong-Suk Lee	February 14, 2002	Kim 530
B26	USP 6,947,707	U.S.	Balaji Raghothaman	September 20, 2005	Raghothaman
B27	USP 6,533,012	U.S.	Marcos Katz	April 22, 2003	Katz
B29	USP 6,473,036 / USPP 2003/0125040	U.S.	Jay Walton, Mark Wallace, Steven Howard	July 3, 2003	Walton 040
B30	USP 7,248,841	U.S.	Brian Agee, Matthew Bromberg	July 24, 2007	Agee 841
B32	USP 6,317,586	U.S.	Martin Haardt	November 13, 2001	Haardt 586
B33	USP 6,141,567	U.S.	Michael Youssefmir, Mitchell D. Trott, Kamaraj Karuppiah, Paul Petrus	October 31, 2000	Youssefmir 567
B34	USPP 2004/0018818	U.S.	Ari Hottinen, Risto Wichman, Olay Tirkkonen	January 29, 2004	Hottinen 818
B35	USP 6,031,877	U.S.	Simon Saunders	February 29, 2000	Saunders 877
B36	Japanese Patent Pub. JP2002290317 A	Japan	Daisuke Jitsukawa, Hiroyuki Seti, Yoshiaki Tanaka	October 4, 2002	Jitsukawa
B37	USPP 2002/0131381	U.S.	Sung-jin Kim, Yong-Suk Lee, Sung-Ho Choi, Hyun-woo Lee, Sung-	September 19, 2002	Kim 381

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
			Oh Hwang, Byung-Jae Kwak, Yong-Jun Kwak, Sang-Hwan Park		
B38	USP 7,116,723	U.S.	Sung-jin Kim, Kwang-bok Lee, Hyeon-Woo Lee, Keun-chul Hwang, Ho-Kyu Choi, Yong-Suk Lee	October 3, 2006	Kim 723
B40	USPP 2002/0158801	U.S.	William Crilly, Ken Biba, Robert Conley	October 31, 2002	Crilly
B41	USP 5,634,199	U.S.	Derek Gerlach, Arogyaswami Paulraj, Gregory G. Raleigh	May 27, 1997	Gerlach 199
B42	USP 6,895,258	U.S.	Shimon Scherzer, Piu Wong	May 17, 2005	Scherzer 258
B43	USP 6,760,388	U.S.	John Ketchum, Mark Wallace, Steven Howard, Jay Walton	July 6, 2004	Ketchum
B44	USP 6,359,923	U.S.	Brian G. Agee, Matthew Bromberg, Derek Gerlach, David Gibbons, James Timothy Golden, Minnie Ho, Elliott Hoole, Mary Jesse, Robert Lee Maxwell, Robert G. Mechaley, Jr., Robert Ray Naish, David J. Nix, David James Ryan, David Stephenson	March 19, 2002	Agee 923
B45	USP 6,473,036	U.S.	James Proctor, Jr.	October 29, 2002	Proctor 036
B46	USPP 2003/0017853	U.S.	Sridhar Kanamaluru, Zygmund Turski, Henry Owen	January 23, 2003	Kanamaluru
B47	U.S. 6,970,722	U.S.	Michael Lewis	November 29, 2005	Lewis

Exh.	Patent/Publication No.	Country of Origin	Named Inventor	Issue / Publication Date	Short Title
B48	U.S. 7,158,501	U.S.	Hideo Kasami, Kuniaki Ito, Kiyoshi Toshimitsu, Tomoko Adachi	January 2, 2007	Kasami '501
B49	U.S. 7,263,385	U.S.	Mehmet Izzet Gurelli, Raul Hernan Etkin	August 28, 2007	Gurelli
B50	U.S. 6,895,253	U.S.	Manuel Joseph Carloni, Michael James Gans, Reinaldo A. Valenzuela, Jack Harriman Winters	May 17, 2005	Carloni
B51	U.S. 7,042,394	U.S.	Ian Sayers	May 9, 2006	Sayers
B52	U.S. 2002/0041430	U.S.	Hideo Kasami, Shuichi Obayashi	May 9, 2006	Kasami '430
B53	U.S. 2003/0060205	U.S.	Joseph Shapira	March 27, 2003	Shapira
B54	U.S. 6,795,409	U.S.	Michael Youssefmir, Mitchell D. Trott, Roger Rogard	September 21, 2004	Youssefmir
B55	U.S. 7,039,441	U.S.	Douglas O. Reudink, Mark D. Reudink	May 2, 2006	Reudink
B56	U.S. 5,592,490	U.S.	Craig H. Barratt, David M. Parish, Richard H. Roy, III	January 7, 1997	Barratt
B57	U.S. 7,529,525	U.S.	Omri Hovers, Shahar Kagan, Nanu Peri, Milena Chechik	May 5, 2009	Hovers
B58	USP 6,927,728	U.S.	Frederick W. Vook, Timothy A. Thomas, Xiangyang Zhuang	August 9, 2005	Vook

## 2. Prior Art Non-Patent Publications

In addition to the patents and patent and patent application publications, Defendants disclose the following additional publications:

### a. The '256 Patent

Exh.	Title	Author / Publisher	Date Published	Short Title
A16	3GPP TSG RAN WG1 R1-99c10	Motorola	August 30-September 3, 1999	Motorola 3GPP

Exh.	Title	Author / Publisher	Date Published	Short Title
A19	Space-Time Signaling in Multi-Antenna Systems	Robert W. Heath Jr.	November 2001	Heath 2001
A21	Won Mee Jang et al., Joint Transmitter-Receiver Optimization in Synchronous Multiuser Communications over Multipath Channels, 46 IEEE Trans. Comm. 269	Won Mee Jang, Branimir R. Vojcic, Raymond Pickholtz	February 1998	Jang
A24	Ari Hottinen and Risto Wichman, Transmit Diversity Using Filtered Feedback Weights in the FDD/WCDMA System, 2000 Int'l Zurich Seminar on Broadband Commc's Accessing Transmission Network Proceedings 15	Ari Hottinen, Risto Wichman	2000	Hottinen 2000
A25	Derek Gerlach and Arogyaswami Paulraj, Base Station Transmitter Antenna Arrays with Mobile to Base Feedback, 1993 Asilomar Conf. on Signals Systems and Computers 1432	Derek Gerlach, Arogyaswami Paulraj	1993	Gerlach 1993
A28	R. Thomas Dewberry et al., Transmit Diversity in 3G CDMA Systems, 40 IEEE Commc'ns Magazine 68, April 2002	R. Thomas Dewberry, Steven D. Gray, D. Mihai Ionescu, Giridhar Mandyam, Balaji Raghothaman	April 2002	Derryberry
A31	Pramod Viswanath et al, Opportunistic Beamforming Using Dumb Antennas, 48 IEEE Trans. on Information Theory 1277	Pramod Viswanath, David N. C. Tse, Rajiv Laroia	June 2002	Viswanath

Exh.	Title	Author / Publisher	Date Published	Short Title
A39	Banister, Brian Clarke, "Feedback Assisted Multi-Antenna Transmission Weight Adaptation for Wireless Communications"	Brian Clarke Banister	2002	Banister 2002
A59	Impact of Closed-Loop Power Control on SDMA-TDMA System Performance, Proc. IEEE Vehicular Tech. Conf. (2002)	Yunjian Jia, Shinsuke Hara, Yoshitaka Hara	September 28, 2002	Jia
A60	A Dynamic Channel Assignment Algorithm for Cellular System with Adaptive Array Antennas, IEEE Vehicular Tech. Conf. (1999)	Lan Chen, Hidekasu Marata, Susumu Yoshida, Shouichi Hirose	May 20, 1999	Chen
A61	Combined Downlink Beamforming and Channel Estimation for High Data Rate CDMA Systems, Proc. IEEE Signal Processing Workshop on Statistical Signal Processing (2001)	Sylvie Perreau	August 8, 2001	Perreau
A62	Adaptive Transmitting Antenna Methods for Multipath Environments, IEEE Globecom. Communications: The Global Bridge	Derek Gerlach, Arogyaswami Paulraj	December 2, 1994	Gerlach AT
A63	Adaptive Transmitting Antenna Arrays at the Base Station in Mobile Radio Networks	Derek Gerlach	August 1995	Gerlach Thesis
A64	Applications of Antenna Arrays to Mobile Communications, Part I – Performance Improvement, Feasibility, and System Consideration, 85 Proc. IEEE 1031 (1997)	Lai C. Godara	July 1997	Godara
A65	Downlink Beam-Forming Method Using STBC for Mobile Propagation Environments, IEEE Vehicular Tech. Conf. (2002)	Yasushi Takatori, Keizo Cho, Toshikazu Hori	May 9, 2002	Takatori

Exh.	Title	Author / Publisher	Date Published	Short Title
A66	Transmit Beamforming Power Control for Cellular Wireless Systems, 16 IEEE J. on Selected Areas in Comm'n 1437 (1998)	Farrokh Rashid Farrokhi, K. J. Ray Liu, Leandros Tassiulas	October 1998	Rashid Farrokhi
A67	An Overview of Smart Antenna Technology for Mobile Communications Systems, IEEE Communications Surveys, Fourth Quarter 1999, Vol. 2, No. 4	Per H. Lehne, Magne Pettersen	Fourth Quarter 1999	Lehne
A68	Digital Beamforming in Wireless Communications	John Litva, Titus Kwok Yeung Lo	August 31, 1996	Litva

**b. The '569 Patent**

Exh.	Title	Author / Publisher	Date Published	Short Title
B16	3GPP TSG RAN WG1 R1-99c10	Motorola	August 30-September 3, 1999	Motorola 3GPP
B19	Space-Time Signaling in Multi-Antenna Systems	Robert W. Heath Jr.	November 2001	Heath 2001
B21	Won Mee Jang et al., Joint Transmitter-Receiver Optimization in Synchronous Multiuser Communications over Multipath Channels, 46 IEEE Trans. Comm. 269	Won Mee Jang, Branimir R. Vojcic, Raymond Pickholtz	February 1998	Jang
B24	Ari Hottinen and Risto Wichman, Transmit Diversity Using Filtered Feedback Weights in the FDD/WCDMA System, 2000 Int'l Zurich Seminar on Broadband Commc's Accessing Transmission Network Proceedings 15	Ari Hottinen, Risto Wichman	2000	Hottinen 2000

Exh.	Title	Author / Publisher	Date Published	Short Title
B25	Derek Gerlach and Arogyaswami Paulraj, Base Station Transmitter Antenna Arrays with Mobile to Base Feedback, 1993 Asilomar Conf. on Signals Systems and Computers 1432	Derek Gerlach, Arogyaswami Paulraj	1993	Gerlach 1993
B28	R. Thomas Dewberry et al., Transmit Diversity in 3G CDMA Systems, 40 IEEE Commc'ns Magazine 68, April 2002	R. Thomas Dewberry, Steven D. Gray, D. Mihai Ionescu, Giridhar Mandyam, Balaji Raghothaman	April 2002	Derryberry
B31	Pramod Viswanath et al, Opportunistic Beamforming Using Dumb Antennas, 48 IEEE Trans. on Information Theory 1277	Pramod Viswanath, David N. C. Tse, Rajiv Laroia	June 2002	Viswanath
B39	Banister, Brian Clarke, "Feedback Assisted Multi-Antenna Transmission Weight Adaptation for Wireless Communications"	Brian Clarke Banister	2002	Banister 2002
B59	Impact of Closed-Loop Power Control on SDMA-TDMA System Performance, Proc. IEEE Vehicular Tech. Conf. (2002)	Yunjian Jia, Shinsuke Hara, Yoshitaka Hara	September 28, 2002	Jia
B60	A Dynamic Channel Assignment Algorithm for Cellular System with Adaptive Array Antennas, IEEE Vehicular Tech. Conf. (1999)	Lan Chen, Hidekasu Marata, Susumu Yoshida, Shouichi Hirose	May 20, 1999	Chen

Exh.	Title	Author / Publisher	Date Published	Short Title
B61	Combined Downlink Beamforming and Channel Estimation for High Data Rate CDMA Systems, Proc. IEEE Signal Processing Workshop on Statistical Signal Processing (2001)	Sylvie Perreau	August 8, 2001	Perreau
B62	Adaptive Transmitting Antenna Methods for Multipath Environments, IEEE Globecom. Communications: The Global Bridge	Derek Gerlach, Arogyaswami Paulraj	December 2, 1994	Gerlach AT
B63	Adaptive Transmitting Antenna Arrays at the Base Station in Mobile Radio Networks	Derek Gerlach	August 1995	Gerlach Thesis
B64	Applications of Antenna Arrays to Mobile Communications, Part I – Performance Improvement, Feasibility, and System Consideration, 85 Proc. IEEE 1031 (1997)	Lai C. Godara	July 1997	Godara
B65	Downlink Beam-Forming Method Using STBC for Mobile Propagation Environments, IEEE Vehicular Tech. Conf. (2002)	Yasushi Takatori, Keizo Cho, Toshikazu Hori	May 9, 2002	Takatori
B66	Transmit Beamforming Power Control for Cellular Wireless Systems, 16 IEEE J. on Selected Areas in Comm'n 1437 (1998)	Farrokh Rashid Farrokhi, K. J. Ray Liu, Leandros Tassiulas	October 1998	Rashid Farrokhi
B67	An Overview of Smart Antenna Technology for Mobile Communications Systems, IEEE Communications Surveys, Fourth Quarter 1999, Vol. 2, No. 4	Per H. Lehne, Magne Pettersen	Fourth Quarter 1999	Lehne
B68	Digital Beamforming in Wireless Communications	John Litva, Titus Kwok Yeung Lo	August 31, 1996	Litva

### 3. Prior Art Systems



Defendants also contend that the Asserted Claims are invalid in view of public knowledge, uses and/or offers for sale or sales of products and services that are prior art under 35 U.S.C. § 102(a) and/or 35 U.S.C. § 102(b) and/or prior inventions made in this country by other inventors who had not abandoned, suppressed, or concealed them under 35 U.S.C. § 102(g), and that anticipate or render obvious the Asserted Claims.

The following lists each system that is now known by Defendants to constitute prior art under 35 U.S.C. §§ 102(a), (b) and/or (g). Defendants contend that the following descriptions and events are stated on information and belief, and are supported by the information and documents that will be produced by Defendants and/or third parties. As discovery is ongoing, Defendants continue to investigate these events.

Defendants also reserve the right to rely upon any system, public knowledge or use embodying or otherwise incorporating any of the prior art disclosed below, alone or in combination. Defendants further reserve the right to rely upon any other documents or references describing any such system, knowledge or use.

The following systems, and any other systems identified in these contentions, are prior art under one or more of 35 U.S.C. § 102(a), (b), and (g).

**a. '256 Patent**

In addition to the above patents and publications, the ArrayComm IntelliCell products are prior art based on their public sale and use by ArrayComm at least as early as 2000.

Defendants also identify prior art products, systems and/or printed publications that were generated as part of AT&T's "Project Angel." Project Angel related to AT&T's development (at least as early as 2000) of a multi-user fixed wireless system that provided high-speed Internet, voice telephone service, and home networking. AT&T's work on Project Angel led to public testing no later than 1999 in Dallas, Texas, with around 2,000 customers participating in testing.

AT&T also commercially implemented this system no later than March, 2000 in Fort Worth, Texas, where it offered fixed wireless Internet service for sale to customers. AT&T subsequently sold Project Angel in 2002 to Netro Corp., who was in turn acquired by SR Telecom Inc. in 2003. SR Telecom entered bankruptcy in 2007. Defendants have exercised reasonable diligence in trying to discover more information about Project Angel such that the related systems and printed publications could be identified with more detail in claim charts. Nevertheless, given the passage of time and the multiple companies involved, discovery is ongoing and Defendants reserve the right to supplement their contentions to include additional information that may become available.

Defendants also identify prior art products and systems that were generated as part of Navini Networks' broadband access equipment including at least Navini's Ripwave line of products. Navini Networks was founded in January 2000 and provided scalable, wireless broadband access network that required zero installation at the end-user site and offered non-line-of-sight operation, with the added benefit of nomadic/mobile capabilities. On information and belief, Navini's products incorporated adaptive antennas, transmitters, receivers, and beamforming (or spot forming) in order to create transmission peaks and nulls. Navini Networks was based in Plano, TX and had over 70 worldwide deployments of its products. Defendants have exercised reasonable diligence in trying to discover more information about Navini Network's products during the relevant, early 2000 timeframe such that the related systems and printed publications could be identified with more detail in claim charts. Nevertheless, given the passage of time and the multiple companies involved, discovery is ongoing and Defendants reserve the right to supplement their contentions to include additional information that may become available.

Furthermore, based on information currently known to Defendants, products or systems from at least the following companies may also constitute prior art based on their public sale and

use prior to the claimed priority date of the '256 Patent: Iospan Wireless (a.k.a. Gigabit Wireless); Motia, Inc.; Clarity Wireless, Corp.; Cognio, Inc.; Motorola, Inc.; Motorola Solutions, Inc.; Motorola Mobility, LLC; Lenovo Group Limited; Google, Inc.; Toshiba Corp.; Kabushiki Kaisha Toshiba, Japan; and Metawave Corp. Defendants' investigation, including third-party discovery in this matter, is ongoing.

**b. '569 Patent**

In addition to the above patents and publications, the ArrayComm IntelliCell products are prior art based on their public sale and use by ArrayComm at least as early as 2000.

Defendants also identify prior art products, systems and/or printed publications that were generated as part of AT&T's "Project Angel." Project Angel related to AT&T's development (at least as early as 2000) of a multi-user fixed wireless system that provided high-speed Internet, voice telephone service, and home networking. AT&T's work on Project Angel led to public testing no later than 1999 in Dallas, Texas, with around 2,000 customers participating in testing. AT&T also commercially implemented this system no later than March, 2000 in Fort Worth, Texas, where it offered fixed wireless Internet service for sale to customers. AT&T subsequently sold Project Angel in 2002 to Netro Corp., who was in turn acquired by SR Telecom Inc. in 2003. SR Telecom entered bankruptcy in 2007. Defendants have exercised reasonable diligence in trying to discover more information about Project Angel such that the related systems and printed publications could be identified with more detail in claim charts. Nevertheless, given the passage of time and the multiple companies involved, discovery is ongoing and Defendants reserve the right to supplement their contentions to include additional information that may become available.

Defendants also identify prior art products and systems that were generated as part of Navini Networks' broadband access equipment including at least Navini's Ripwave line of products. Navini Networks was founded in January 2000 and provided scalable, wireless

broadband access network that required zero installation at the end-user site and offered non-line-of-sight operation, with the added benefit of nomadic/mobile capabilities. On information and belief, Navini's products incorporated adaptive antennas, transmitters, receivers, and beamforming (or spot forming) in order to create transmission peaks and nulls. Navini Networks was based in Plano, TX and had over 70 worldwide deployments of its products. Defendants have exercised reasonable diligence in trying to discover more information about Navini Network's products during the relevant, early 2000 timeframe such that the related systems and printed publications could be identified with more detail in claim charts. Nevertheless, given the passage of time and the multiple companies involved, discovery is ongoing and Defendants reserve the right to supplement their contentions to include additional information that may become available.

Furthermore, based on information currently known to Defendants, products or systems from at least the following companies may also constitute prior art based on their public sale and use prior to the claimed priority date of the '569 Patent: Iospan Wireless (a.k.a. Gigabit Wireless); Motia, Inc.; Clarity Wireless, Corp.; Cognio, Inc.; Motorola, Inc.; Motorola Solutions, Inc.; Motorola Mobility, LLC; Lenovo Group Limited; Google, Inc.; Toshiba Corp.; Kabushiki Kaisha Toshiba, Japan; and Metawave Corp. Defendants' investigation, including third-party discovery in this matter, is ongoing.

**B. P.R. 3-3(b) Disclosures: Each Item of Prior Art that Anticipates and/or Renders Obvious the Asserted Claim, and Obviousness Combinations and Motivations to Combine**

Based on presently known information and the apparent constructions XR is asserting in its Infringement Contentions, the prior art references identified above anticipate the Asserted Claims or, alone or in combination with the knowledge in the art, render the Asserted Claims obvious. To the extent XR asserts that any of the prior art references charted in Exhibits A-01 et seq., and B-01 et seq, fail to explicitly or inherently disclose any element of the Asserted Claims,

Defendants contend that it would have been obvious to modify such reference to include the allegedly missing element, in view of the knowledge of one of ordinary skill in the art, the admitted prior art of the Asserted Patents, and/or in combination with any of the other prior art references identified in the Exhibits for that respective patent. To the extent XR contends that any primary reference does not anticipate the Asserted Claims, it would have been obvious to combine or modify the primary references with concepts from other prior art.

In particular, for each limitation of the Asserted Claims that XR contends is not met by a particular primary reference, Defendants contend that the limitation (and claim as a whole) is obvious based on a combination of that particular primary reference with (1) any other primary reference disclosing that limitation, (2) any other reference as identified in Exhibits A–E as disclosing that limitation, (3) any admitted prior art, as explained in the background of each patent or discussed in the file history, and/or (4) the knowledge of a person of ordinary skill in the art including any of the references and concepts discussed herein regarding the relevant background and state of the art. The specific combinations of prior art that Defendants contend render the Asserted Claims obvious are readily determinable as described herein and as provided in Exhibits A-E. Defendants' obviousness grounds for each dependent claim incorporate the obviousness grounds for the claim(s) from which the dependent claim depends in addition to any obviousness grounds identified in the charts for the dependent claim.

Defendants do not yet have the benefit of XR's positions on the prior art, including what (if any) elements it contends are missing in each prior art reference, whether XR agrees that a reference is in fact prior art, and whether XR agrees that a person of ordinary skill in the art would be motivated to combine specific references. Defendants reserve the right to supplement these

obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) as discovery in the case progresses, including expert discovery.

While the categories of art (patents/applications, non-patent publications, and systems) below are organized by asserted patent number, because of the overlapping nature of the asserted patents, Defendants identify each reference in each category as art applicable to each of the asserted patents.

### **1. Background and State of the Art**

Defendants set forth below a summary of their current understanding of the state of the art as understood as of the asserted priority dates of the Asserted Patents for the general subject matter of each of the Asserted Patents. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time the Asserted Patents were filed and may have been used in determining whether and how to combine references to achieve the claimed inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that “the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious”). Defendants expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to each of the Asserted Patents. In addition to the prior art identified in Section II.A, Defendants reserve the right to rely on each of the prior art references in its prior art document production. Further, Defendants identify the following prior art references that provide information concerning the state of the art at or before the priority date of the Asserted Claims.

#### **a. '256 Patent**

<b>Patent No. / Publication</b>
Prior art listed in the file history of the '256 Patent, or that of any related foreign or domestic patent applications
HOMERF
GSM
IS-95
WCDMA
CDMA2000
IEEE 802.11-1999
IEEE 802.11a-1999
IEEE 802.11b-1999
IEEE 802.11f-2003
IEEE 802.11g-2003
IEEE 802.11h-2003
Smart Antennas for Dummies (Author: Arild Jacobsen, ISBN: 82-423-0388-6)
Gerard. J. Foschini (October 1996), "Layered Space-Time Architecture for Wireless Communication in a Fading Environment When Using Multi-Element Antennas," Bell Laboratories Technical Journal: 41–59.
P. W. Wolniansky; G. J. Foschini; G. D. Golden; R. A. Valenzuela (September 1998), "V-BLAST: An Architecture for Realizing Very High Data Rates Over the Rich-Scattering Wireless Channel," Proc. URSI ISSSE: 295–300.
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U.S. 5,553,074
U.S. 5,697,066
U.S. 5,739,788
U.S. 5,886,988
U.S. 5,890,067
U.S. 6,006,110
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U.S. 6,101,399
U.S. 6,219,561
U.S. 6,330,460
U.S. 6,351,499
U.S. 6,564,036
U.S. 6,665,545
U.S. 6,687,492
U.S. 6,795,409

Patent No. / Publication
U.S. 7,130,662
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S.V. Krishnamurthy, A.S. Acampora, and M. Zorzi, “Polling-Based Media Access Protocols for Use with Smart Adaptive Array Antennas,” IEEE/ACM Trans. Networking Vol. 9, No. 2, April 2001.
Z. Zhang and A.S. Acampora, “Performance of a Modified Polling Strategy for Broadband Wireless LANs in a Harsh Fading Environment,” IEEE GLOBECOM '91 Conference Record, Dec. 1991, Phoenix.
S. Krishnamurthy, A. S. Acampora, and M. Zorzi, “Polling Based Media Access Protocols for Use With Smart Adaptive Array Antennas”, Conference Record, International Conference on Universal Personal Communications, Florence, Oct., 1998.
A. S. Acampora and S. V. Krishnamurthy, “A New Adaptive MAC Layer Protocol for Wireless ATM Networks in Harsh Fading and Interference Environments,” IEEE Intl. Conf. Universal Personal Comm., San Diego, Oct. 1997.
A.S. Acampora and J.H. Winters, “A Wireless Network for Wide-Band Indoor Communications,” JSAC, Vol. 5, No. 5, 1987.
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S. Krishnamurthy, A. S. Acampora, and M. Zorzi, "Polling Based Media Access Protocols for Use With Smart Adaptive Array Antennas", Conference Record, International Conference on Universal Personal Communications, Florence, Oct., 1998.
A. S. Acampora and S. V. Krishnamurthy, "A New Adaptive MAC Layer Protocol for Wireless ATM Networks in Harsh Fading and Interference Environments," IEEE Intl. Conf. Universal Personal Comm., San Diego, Oct. 1997.
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## **2. Obviousness**

Defendants contend that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims, it would have been obvious to combine any of the references, systems, concepts, or technologies discussed in this Section with those primary references. Defendants also reserve the right to rely on the discussions of the state of the art and prior art in each of the Asserted Patent specifications and their file histories including foreign file histories of related patents in explaining the state of the art. Defendants further expressly reserve the right to supplement their summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. Defendants also expressly reserve the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and XR, regarding the state of the art.

### **a. '256 Patent**

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibits A (e.g., A-01). In the asserted combinations between two or more references that are charted in the Exhibit A charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s). For example, if XR alleges that element 18[a] is not present in chart A-01, the combination of A-01 and A-30 or the combination of A-01 and A-40 would include the content of A-30 and A-40, respectively, for element 18[a].

**Weight Computations.** Claims [18e], [18f], [18g], [18h], 20, 21, [22e], [22f], 23, 24, 25, and 28 refer to computing weights that are subsequently used to transmit beamforming. Under

XR's apparent application of the claims, such weight computations were well-known prior to the priority date of the '256 Patent. References that teach these limitations include: Banister 758 (see A-1 chart at element [18e]), Lindskog (see A-02 chart at element [18e]), Foschini (see A-03 chart at element [18e]), Scherzer 647 (see A-04 chart at element [18e]), Xu (see A-05 chart at element [18e]), Ylitalo (see A-07 chart at element [18e]), Kim 983 (see A-08 chart at element [18e]), Yoshida 901 (see A-09 chart at element [18e]), Cyzs (see A-10 chart at element [18e]), Harrison (see A-11 chart at element [18e]), Levy 643 (see A-12 chart at element [18e]), Hottinen 286 (see A-13 chart at element [18e]), Burke (see A-14 chart at element [18e]), Alamouti (see A-15 chart at element [18e]), Motorola 3GPP (see A-16 chart at element [18e]), Kuwahara (see A-17 chart at element [18e]), Paulraj 290 (see A-18 chart at element [18e]), Ottersten (see A-20 chart at element [18e]), Jang (see A-21 chart at element [18e]), Gerlach 647 (see A-22 chart at element [18e]), Kim 530 (see A-23 chart at element [18e]), Hottinen 2000 (see A-24 chart at element [18e]), Gerlach 1993 (see A-25 chart at element [18e]), Raghothaman (see A-26 chart at element [18e]), Katz (see A-27 chart at element [18e]), Derryberry (see A-28 chart at element [18e]), Walton 040 (see A-29 chart at element [18e]), Agee 841 (see A-30 chart at element [18e]), Viswanath (see A-31 chart at element [18e]), Haardt 586 (see A-32 chart at element [18e]), Youssefmir 567 (see A-33 chart at element [18e]), Hottinen 818 (see A-34 chart at element [18e]), Saunders 877 (see A-35 chart at element [18e]), Jitsukawa (see A-36 chart at element [18e]), Kim 381 (see A-37 chart at element [18e]), Kim 723 (see A-38 chart at element [18e]), Banister 2002 (see A-39 chart at element [18e]), Crilly (see A-40 chart at element [18e]), Gerlach 199 (see A-41 chart at element [18e]), Scherzer 258 (see A-42 chart at element [18e]), Ketchum (see A-43 chart at element [18e]), Agee 923 (see A-44 chart at element [18e]), Proctor 036 (see A-45 chart at element [18e]).

The motivation to combine with each of these references (beyond the other motivations identified herein) includes several factors including: (1) express statements regarding the benefits of beamforming, (2) express statements that weight computations were used for transmit beamforming, and (3) the knowledge of a POSITA recognizing that transmit beamforming and weight computations were well-known and in use.

**Transmission Peaks and Transmission Nulls.** Claims [18g] [18h], [22f], and [25] recite the steps of constructing signals to include transmission peaks and transmission nulls. Such techniques were well-known prior to the priority date of the '256 Patent. References that teach these limitations include: Kanamaluru (see A-46 chart at element [18g], [18h]), Lewis (see A-47 chart at element [18g], [18h]), Gurelli (see A-49 chart at element [18g], [18h]), Gerlach 647, (see A-22 chart at element [18g], [18h]), Gerlach 199 (see A-41 chart at element [18g], [18h]), Crilly (see A-40 chart at element [18g], [18h]), Kasami 430 (see A-52 chart at element [18g], [18h]), Shapira (see A-53 chart at element [18g], [18h]), Lindskog (see A-02 chart at element [18g], [18h]), Youssefmir (see A-33 chart at element [18g], [18h]), Agee 841 and 923 (see A-30, A-44 charts at element [18g], [18h]), Reudink (see A-55 chart at element [18g], [18h]), Jia (see A-59 chart at element [18g], [18h]), Perreau (see A-61 chart at element [18g], [18h]), Gerlach-AT (see A-62 chart at element [18g], [18h]), Gerlach Thesis (see A-63 chart at element [18g], [18h]), Godara (see A-64 chart at element [18g], [18h]), Hovers (see A-57 chart at element [18g], [18h]), Vook (see A-58 chart at element [18g], [18h]), Lehne (see A-67 chart at element [18g], [18h]), Litva.

The motivation to combine with each of these references (beyond the other motivations identified herein) includes several factors including: (1) express statements regarding the benefits of placing transmission peaks and transmission nulls, (2) express statements regarding the benefits



of beamforming, and (3) the knowledge of a POSITA recognizing that beamforming provided benefits including increased transmission range as well as reduced signal to noise ratio, and further enabled efficient spectrum reuse.

**b. '569 Patent**

In the following discussion, the claim elements refer to the elements as charted in the charts for Exhibit B (e.g., B-01). In the asserted combinations between two or more references that are charted in the Exhibit B charts, the combination would be to use the citations for one of the elements (as shown in the charts) from the reference(s) to fill in the gaps for the other reference(s). For example, if XR alleges that element 11[a] is not present in chart B-01, the combination of B-01 and B-30 would include the content of B-30 for element 11[a], and the combination of B-01 and B-40 would include the content of B-40 for element 11[a].

**Adaptive Antennas.** Claims [11pre], [11b], [11c], [11d], [11e], [11f], 13, 15, 29, and 20 recite an adaptive antenna. Adaptive antennas were well known prior to the priority date of the '569 Patent. References that teach adaptive antennas include: Kanamaluru (see B-46 chart at elements [11b] [11c]), Lewis (see B-47 chart at elements [11b] [11c]), Kasami 501 (see B-48 chart at elements [11b] [11c]), Gurelli (see B-49 chart at elements [11b] [11c]), Gerlach 647 (see B-22 chart at elements [11b] [11c]), Gerlach 199 (see B-41 chart at elements [11b] [11c]), Crilly (see B-40 chart at elements [11b] [11c]), Carloni (see B-50 chart at elements [11b] [11c]), Sayers (see B-51 chart at elements [11b] [11c]), Kasami 430 (see BX-52 chart at elements [11b] [11c]), Shapira (see BX-X chart at elements [11b] [11c]), Lindskog (see B-02 chart at elements [11b] [11c]), Youssefmir (see B-33 chart at elements [11b] [11c]), Agee 841 (see B-30 chart at elements [11b] [11c]), Reudink (see B-55 chart at elements [11b] [11c]), Barratt (see B-56 chart at elements [11b] [11c]), Jia (see B-59 chart at elements [11b] [11c]), Chen (see B-60 chart at elements [11b] [11c]), Perreau (see B-61 chart at elements [11b] [11c]), Gerlach-AT (see B-62 chart at elements



[11b] [11c]), Gerlach Thesis (see B-63 chart at elements [11b] [11c]), Godara (see B-64 chart at elements [11b] [11c]), Rashid-Farrokhi (see B-66 chart at elements [11b] [11c]), Hovers (see B-57 chart at elements [11b] [11c]), Vook (see B-58 chart at elements [11b] [11c]), Lehne (see B-67 chart at elements [11b] [11c]), Litva (see B-68 chart at elements [11b] [11c])).

The motivation to combine with each of these references (beyond the other motivations identified herein) includes several factors, including but not limited to: (1) express statements regarding the benefits of antenna arrays, and (2) the knowledge of a POSITA about the operation of and uses for antenna arrays, including functionality enabled.

**C. P.R. 3-3(c) Disclosures: Charts Identifying Where in Each Item of Prior Art Each Element of the Asserted Claim Is Found**

Exhibits A-01 et seq., and B-01 et seq., of these contentions are charts that specifically identify where each element of each Asserted Claim is found in the prior art. The claim charts in these contentions (Exhibits A-01 et seq., B-01 et seq.) provide example sections within the prior art references that teach or suggest each and every element of the asserted claims either expressly or inherently. The contentions set forth obviousness arguments based on the disclosures in each of the references, teachings well known at the time of filing, admitted prior art, and the knowledge of a person of ordinary skill in the art at the time the respective patent application was filed. If needed, all of the exhibited art can be used in combination for an obvious determination.

For Asserted Claims governed by 35 U.S.C. §112 ¶ 6, the exhibits include identity of structure(s), act(s), or materials in each prior art reference that performs the claimed function. To the extent any limitation of any of the Asserted Claims is construed to have a similar meaning, or to encompass similar feature(s) and function(s), as apparently contended by XR in its Infringement Contentions, or later determined by the Court, and to the extent at least one claim chart in Exhibits A-01 et seq., and B-01 et seq., identifies any prior art reference, or a portion thereof, as disclosing

or teaching such similarly construed claim limitation, such identified prior art reference, or the portion thereof, and Defendants' contentions with respect to such claim limitation and such prior art reference as found in such claim chart, are incorporated by reference, and are part of, Defendants' invalidity contentions with respect to each of the Asserted Claims that includes such similarly construed claim limitation.

**D. P.R. 3-4(d) Disclosures: Invalidity Under 35 U.S.C. § 112**

Pursuant to Local Rule 3-3(d), Defendants contend that certain claims of the Asserted Patents are invalid under 35 U.S.C. § 112 because: (1) the claims are indefinite; (2) the claims are not enabled; and/or (3) the claims lack adequate written description. Defendants' contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative, and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the Asserted Patents, or that any of the claims of the Asserted Patents are not anticipated or rendered obvious by any prior art.

These contentions are based on Defendants' current understanding of XR's Infringement Contentions. To the extent XR contends that the prior art references identified above would not enable a person of ordinary skill to make or use the elements of the Asserted Claims against which they are cited, or to the extent XR contends that the Asserted Claims cover something different from what Defendants understands them to cover, the Asserted Claims do not comply with the enablement, written description, and/or definiteness requirements of 35 U.S.C. § 112 ¶¶ 1 & 2. Because compliance with the requirements of 35 U.S.C. § 112 ¶¶ 1 & 2 depends on the construction of those phrases—and no claim construction positions have been exchanged, no claim construction order issued in this case, and no expert discovery undertaken—Defendants' positions on written description, enablement, and/or indefiniteness are necessarily preliminary at this early stage of the case. A more detailed basis for Defendants' indefiniteness, enablement, and/or written

description defenses will be set forth in Defendants' claim construction briefing and/or expert reports on invalidity and/or in Motion[s] for Summary Judgment of Invalidity, to be served in accordance with the Court's Docket Control Order. Defendants have not taken any depositions related to these issues and discovery is on-going. Defendants specifically reserve the right to amend and/or supplement these contentions based on further developments in the case in accordance with the Court's Rules or as otherwise authorized by the Court.

The written description and enablement requirements are analyzed by comparing the claims with the disclosure in the specification. If the claimed invention does not appear in the specification, the claim fails regardless of whether one of skill in the art could make or use the claimed invention. *See, e.g., Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1348 (Fed. Cir. 2010). To satisfy the enablement requirement, a patentee must "describe the manner and process of making and using the invention so as to enable a person of skill in the art to make and use the full scope of the invention without undue experimentation." *See, e.g., LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1344-45 (Fed. Cir. 2005). To satisfy the written description requirement, the patentee must convey to those skilled in the art that, as of the filing date, the applicant was in possession of the invention, and demonstrate that possession by disclosing the invention in the specification. *See, e.g., Ariad*, 598 F.3d at 1352. A patent must also be precise enough to afford clear notice to what is claimed. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Id.* The standard for assessing if a patent claim is sufficiently definite to satisfy the statutory requirement is whether "one skilled in the art would understand the bounds of the claim when read in light of the specification." *See Novo*

*Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1358 (Fed. Cir. 2003). Claims that depend from claims that are invalid for lack of enablement or written description support inherit the deficiencies of the claims from which they depend and are also invalid.

A claim term can be indefinite based on multiple grounds ranging from the substantive concerns to unresolvable drafting errors, each of which can be fatal to the validity of the claims as a matter of law. For example, a claim directed to a mixed statutory class, like the Asserted Claims here, is not allowed, and any such claim is indefinite. The Federal Circuit has repeatedly held that apparatus claims that contain method claim limitations are indefinite because it is impossible to determine when direct infringement occurs. *See, e.g., Rembrandt Data Techs., LP v. AOL, LLC*, 641 F.3d 1331, 1339-40 (Fed. Cir. 2723) (an independent claim that recited both an apparatus and a method of using that apparatus was indefinite, as was its dependent claims); *IPXL Holdings v. Amazon.com*, 430 F.3d 1377, 1384 (Fed. Cir. 2005); *In re Katz Interactive Call Processing Patent Litig.*, 639 F.3d 1303, 1318 (Fed. Cir. 2011) (mixed claims “create confusion as to when direct infringement occurs because they are directed both to systems and to actions performed by” users). Claim terms that lack antecedent basis are indefinite. *See, e.g., Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348-49 (Fed. Cir. 2002) (claim ending in the middle of a claim limitation was indefinite because it was “impossible to discern the scope of such a truncated limitation”). Furthermore, means-plus-function claims, which invoke 35 U.S.C. § 112 ¶6, may be invalid as indefinite where a patent owner has failed to disclose adequate corresponding structure linked to the recited claim functionality. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1311-12 (Fed. Cir. 2012).

In the Supreme Court’s decision in *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014), the Court clarified that a patent is invalid “for indefiniteness if its claims read

in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). “[I]t cannot be sufficient that a court can ascribe some meaning to a patent’s claim; the definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters post hoc.” *Id.* at 2130. The definiteness inquiry necessarily demands that the “patent and prosecution history disclose a single known approach or establish that, where multiple known approaches exist, a person of ordinary skill in the art would know which approach to select.” *Id.* Claims that depend from claims that are indefinite inherit the indefiniteness of the claims from which they depend and are also indefinite.

The Asserted Claims of the Asserted Patents are invalid because the Asserted Patents do not include sufficient written description of the purported inventions claimed therein, and of the manner and process of making and using said inventions, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which the inventions pertain, or which they are most nearly connected, to make and use any of the claimed inventions. 35 U.S.C. § 112 ¶1.

Defendants contend that the specifications to which priority is sought fail to describe the full scope of the claimed inventions in sufficient detail such that one skilled in the art could reasonably conclude that the inventor had possession of the claimed invention as of the filing dates to which the Asserted Patents claim priority. The specifications of the Asserted Patents fail to describe the claimed inventions in a manner understandable to one of ordinary skill in the art and fail to show that the listed inventors actually invented the claimed inventions. Accordingly, each of the Asserted Claims is invalid for lack of adequate written description under 35 U.S.C. § 112 ¶1.

In addition, Defendants contend that, at the time of XR’s claimed priority date, the patent applications to which XR claims priority did not enable one of ordinary skill in the art to make and use the full scope of the claimed inventions without undue experimentation. Accordingly, each of the Asserted Claims is invalid for lack of enablement under 35 U.S.C. § 112 ¶1.

Defendants also contend that the Asserted Claims fail to particularly point out and distinctly claim the subject matter that the listed inventor regarded as his invention. Defendants contend that one of ordinary skill in the art would not understand the scope of each of the Asserted Claims when the claim is read in light of the specification. Accordingly, each of the Asserted Claims is invalid for indefiniteness under 35 U.S.C. § 112, ¶1.

Defendants contend that XR’s apparent claim constructions render the Asserted Claims overly broad in scope and well beyond the purported inventions described in the Asserted Patents. XR is attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the written specification and prosecution history of the Asserted Patents as well as with the understanding of one of ordinary skill in the art at the time the applications that issued as the Asserted Patents were filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history.

Defendant provides below an identification of terms in the Asserted Claims that render the Asserted Claims, at least as apparently construed by XR in its Infringement Contentions as discussed above, invalid pursuant to 35 U.S.C. § 112 as not enabled or lacking sufficient written description.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
256 patent: Claim 18	“receiving a first signal transmission from a first remote device via the first antenna element;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
'256 patent: Claim 18	“receiving a second signal transmission from a second remote device via the second antenna element;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“determining first signal information for the first signal transmission;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“determining second signal information for the second signal transmission, wherein the second signal transmission is different than the first signal transmission;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“determining a first set of weighting values based on the first signal information;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“determining a second set of weighting values based on the second signal information;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“transmitting a third signal to the first remote device via the antenna array, wherein the third signal is constructed based on the first set of weighting values to include one or more first transmission peaks and one or more first transmission nulls in the third signal; and”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 18	“transmitting a fourth signal to the second remote device via the antenna array, wherein	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	the fourth signal is constructed based on the second set of weighting values to include one or more second transmission peaks and one or more second transmission nulls in the fourth signal.”	
’256 patent: Claim 19	“The method of claim 18, wherein the first signal information includes at least one of a transmit power level, a data transmit rate, an antenna direction, quality of service data, and timing data.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’256 patent: Claim 20	“The method of claim 18, further comprising: associating the first set of weighting values with the first remote device; and associating the second set of weighting values with the second remote device.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’256 patent: Claim 21	“The method of claim 18, further comprising: a fifth signal transmission from the first remote device, determining fifth signal information for the fifth signal transmission; updating the first set of weighting values based on the fifth signal information; and associating the updated first set of weighting values with the first remote device.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’256 patent: Claim 22	“receiving a first signal transmission from a remote device via the antenna array;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.



Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
'256 patent: Claim 22	“receiving a second signal transmission from the remote device via the antenna array;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 22	“determining first signal information for the first signal transmission;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 22	“determining second signal information for the second signal transmission, wherein the second signal information is different than the first signal information;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 22	“determining a first set of weighting values based on the first signal information; and”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 22	“transmitting a third signal to the remote device via the antenna array, wherein the third signal is constructed based on the first set of weighting values to include one or more first transmission peaks and one or more first transmission nulls in the third signal.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 23	“The method of claim 22, further comprising: wherein the first set of weighting values is further determined based on the second signal information.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'256 patent: Claim 24	“The method of claim 22, further comprising:	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	associating the first set of weighting values with the remote device; updating the first set of weighting values based on the second signal information; and associating the updated first set of weighting values with the first remote device.”	describe or enable the full breadth of the claims.
’256 patent: Claim 25	“The method of claim 24, further comprising: transmitting a fourth signal to the remote device via the antenna array, wherein the fourth signal is constructed based upon the updated first set of weighting values to include one or more second transmission peaks and one or more second transmission nulls in the fourth signal.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’256 patent: Claim 26	“The method of claim 22, wherein the first signal information includes at least one of a transmit power level, a data transmit rate, an antenna direction, quality of service data, and timing data.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’256 patent: Claim 28	“The method of claim 22, wherein the second signal transmission is received after the first signal transmission and wherein the second signal transmission is received based on the first set of weighting values associated with the remote device. “	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
'569 patent: Claim 11	“A computer-implemented method for use by a wireless access point (AP) in communication with one or more client devices (CP) including a first client device, the wireless AP including a processor, a memory operatively coupled to the processor, a transceiver operatively coupled to the processor, and an adaptive antenna array coupled to the transceiver, the computer-implemented method comprising:”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	“generating, using the processor, first data packets for transmission to the client device;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	“transmitting, using the transceiver and the adaptive array antenna, a directed AP communication beam, including the first data packets, to the first client device;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	“receiving, using the transceiver and the adaptive array antenna, a directed CD communication beam, including second data packets, from the first client device;”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	“directed CD communication beam”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
'569 patent: Claim 11	"obtaining, using the processor and from the second data packets, antenna direction information of an antenna of the first client device;"	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	"storing, by the processor in the memory, the obtained antenna direction information of the antenna of the first client device;"	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 11	"coordinating, by the processor using the transceiver and the adaptive array antenna, directed wireless communications with the first client device based on the obtained antenna direction information of the antenna of the first client device stored in the memory."	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 12	"The computer-implemented method of claim 11, wherein the directed AP communication beam includes transmission peaks and transmission nulls within a coverage area of the directed AP communication beam."	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
'569 patent: Claim 13	"The computer-implemented method of claim 11, wherein the directed CD communication beam is received through a receive beam-forming network from antenna elements of the adaptive antenna array."	
'569 patent: Claim 15	"The computer-	The claim is invalid under pre-AIA 35 U.S.C. §

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	implemented method of claim 11, further comprising: generating, using the processor, additional data packets for transmission to a second client device of the one or more client device; and simultaneously with transmitting the directed AP communication beam to the first client device, transmitting, using the transceiver and the adaptive antenna array, another directed AP communication beam, including the additional data packets, to the second client device.”	112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’569 patent: Claim 16	“The computer-implemented method of claim 11, wherein, based on the second data packets received from the first client device, the transmission peaks are directed at the first client device.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’569 patent: Claim 17	“The computer-implemented method of claim 11, wherein, based on the second data packets received from the first client device, the transmission nulls are directed at a second client device of the one [or] more client devices.”	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.
’569 patent: Claim 19	“The computer-implemented method of claim 11, further comprising: obtaining,	The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.

Asserted Claim(s)	Claim Term	Invalidity Under 35 U.S.C. § 112
	<p>using the processor from the second data packets, timing data of the first client device; storing, by the processor in the memory, the timing data of the first client device; and coordinating, by the processor using the transceiver and the adaptive array antenna, directed wireless communications with the first client device based on the obtained antenna direction information of the antenna and the timing data stored in the memory.”</p>	
’569 patent: Claim 20	<p>“The computer-implemented method of claim 11, further comprising receiving, using the transceiver and the adaptive array antenna, a second directed CD communication beam from a second client device of the one or more client devices; applying, using the processor, a first weight to the directed CD communication beam; and applying, using the processor, a second weight to the second directed CD communication beam, wherein the first weight is different than the second weight.”</p>	<p>The claim is invalid under pre-AIA 35 U.S.C. § 112, ¶ 1 because the specification fails to describe or enable the full breadth of the claims.</p>

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in XR's infringement positions, and/or to account for any changes in the law concerning invalidity under 35 U.S.C. §112. Defendants additionally reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under § 112, including, for example, based on expert testimony.

### **III. P.R. 3-4 DISCLOSURES AND CONTENTIONS**

#### **A. P.R. 3-4(a) Disclosures**

Pursuant to P.R. 3-4(a), Defendants are separately producing representative technical documentation within their possession, custody, and control that show the operation of aspects or elements of the Accused Instrumentality identified by XR in its Infringement Contentions for each Defendant. Defendants reserve the right to supplement these disclosures with additional documentation.

#### **B. P.R. 3-4(b) Disclosures**

In accordance with P.R. 3-4(b), Defendants are producing a single set of prior art references identified in these Invalidity Contentions for prior art related to patents asserted against more than one Defendant. Defendants are also producing prior art references concerning prior art systems and methods. Such documents can be found at the following Bates range: DEFS-PA\_00000001 – DEFS-PA\_00028716. Any prior art references not in English are produced with an English translation of the portion(s) relied upon. These prior art references are cited herein and support the contentions presented. Defendants' search for prior art references, additional documentation, and/or corroborating evidence concerning prior art apparatuses and methods is ongoing. Accordingly, Defendants reserve the right to supplement their production, as provided by the local

rules, as additional prior art references, additional documentation, and/or corroborating evidence concerning prior art documents/apparatuses, and methods are obtained during the course of discovery.

Dated: February 29, 2024

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that on February 29, 2024, the foregoing document was served via e-mail upon all counsel of record in this case.

/s/ Brianna Vinci  
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